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AUTHOR Guerrero, Maria C. M. de
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ABSTRACT

Mental rehearsal is a somewhat ambiguous term in the literature of language acquisition, psychology, and second language learning. However, in second language learning it refers to an important strategic behavior involving silent covert practice of the other language, undertaken in relation to an oral or written, future or past language task. A study helped clarify and expand the role of mental rehearsal as a second language learning strategy. A group of 426 native Spanish-speaking college students of English as a Second Language (ESL) was surveyed on its use of mental rehearsal or inner speech, and 9 subjects identified as consistently using mental rehearsal were interviewed in greater depth. Results suggest that mental rehearsal is a very broad strategy in which inner speech had several different roles and functions (ideational, mnemonic, textual, instructional, evaluative, affective, interpersonal, intrapersonal). Other findings included discovery of different types of mental rehearsal (task-related or self-related, spontaneous or deliberate), moments when rehearsal is most likely to occur, and benefits as perceived by participants. Raising student awareness of mental rehearsal as a powerful second language learning strategy and further research on the subject are recommended. (MSE)

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MENTAL REHEARSAL AS A SECOND LANGUAGE LEARNING STRATEGY

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María C. M. de Guerrero
Associate Professor
Inter American University of Puerto Rico

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Mental Rehearsal as a Second Language Learning Strategy

Abstract

This article offers an in-depth view of mental rehearsal as a L2 learning strategy. A rather ambiguous term in the literature, rehearsal is reviewed in the fields of language learning strategies, psychology, L2/FL acquisition, and L1 learning. What comes out is an important strategic behavior involving the silent covert practice of the other language, undertaken in relation to an oral or written, future or past, language task. Results of an empirical study on inner speech during mental rehearsal of a second language are presented. The study, based on data provided by 426 ESL college students in its quantitative phase and by 9 "rehearsers" in its qualitative phase, helped clarify and expand the role of mental rehearsal as a L2 learning strategy. Mental rehearsal appeared as a very broad strategy in which inner speech adopted several different roles and functions. Other findings included the discovery of different types of mental rehearsal (task-related or self-related, spontaneous or deliberate), the moments when mental rehearsal was most likely to occur, and the benefits of mental rehearsal as perceived by the participants. Raising student awareness about mental rehearsal as a powerful L2 learning strategy, as well as further research, is suggested.

Mental Rehearsal as a Second Language Learning Strategy

Having outgrown its initial field-delimitation and classificatory stage, research in language learning strategies is ostensibly moving into classroom application and learner training (Chamot & Kupper, 1989; O'Malley, 1987; O'Malley, Chamot, Stewner-Manzanares, Russo, & Küpper, 1985; Oxford, 1990; Oxford, Crookall, Cohen, Lavine, Nyikos, & Sutter, 1990: Oxford, Lavine, & Crookall, 1989; Tang, 1990; Wenden, 1987, 1991). While the application of strategy training models is a necessary and inevitable step, another important course of direction is obtaining a thorough, in-depth knowledge and understanding of some of the strategies that have been identified, especially those which appear to have an ambiguous status. One such strategy is rehearsal (Chamot, 1987; O'Malley et al., 1985; Rubin, 1987), an activity whose role as a second language (L2) learning strategy has not been clearly determined yet, although it seems to warrant close investigation. An indication of its importance is found in O'Malley et al.'s study (1985), in which repetition--a strategy that includes not only overt practice but also "silent rehearsal" (p. 583)--had the highest percentage of use of all the cognitive strategies reported by beginning and intermediate English as a second language (ESL) students. To date, there is no documented study of rehearsal as a L2 learning strategy. This article

first reviews the existing literature on "mental" rehearsal--the silent variety of the strategy (as opposed to overt practice)--in various fields and then discusses some findings concerning mental rehearsal from a recent empirical study on L2 inner speech (Guerrero, 1991).

Review of Literature on Mental Rehearsal

The term rehearsal is used with a certain ambiguity in the literature. First, studies in language learning strategies (Chamot, 1987; O'Malley et al., 1985; Rubin, 1987) mention rehearsal but do not define it. Second, mental rehearsal has been grouped within various categories. Rubin (1987, p. 24) includes it under practice, a group of strategies that contribute to storing and retrieving language while the learner is focused on accuracy. Chamot (1987, p. 77) and O'Malley et al. (1985, p. 583) consider it a kind of repetition strategy. Chamot (1987) also includes it under advance preparation, that is, the "planning for and rehearsing of linguistic components necessary to carry out an upcoming language task" (p. 77). Tarone (1983, p. 69) reports a study in which the researchers (Aono & Hillis, 1979, as cited in Tarone, 1983) identified a learner's successful use of rehearsal as a production strategy. In addition, in Chamot's (1987) classification, rehearsal is listed as a metacognitive strategy as well as a cognitive one (p. 77).

In psychology, however, rehearsal constitutes a well-defined object of research within the fields of memory, cognition, and information processing (Bjork, 1970; Bransford, 1979; Donahoe & Wessells, 1980; Flavell, 1977; Lindsay & Norman, 1977). Psychologists define rehearsal as the covert repetition of words, letters or other verbal material for the purpose of remembering. According to Bransford (1979), if information is not actively rehearsed, it is forgotten. Actually, "the more an item is rehearsed, the greater the probability that it will be retained" (p. 44). Rehearsal does not simply imply rote repetition. Two kinds of mental rehearsal are normally distinguished: maintenance rehearsal, which relies on mechanical (rote) repetition and stores information in short-term memory, and elaborative rehearsal, which involves more elaborate forms of encoding such as analysis, association, and integration, and therefore helps retention in long-term memory (Bransford, 1979; Donahoe & Wessells, 1980; Lindsay & Norman, 1977). In addition to aiding retention, rehearsal facilitates recall. As Flavell (1977) points out, "a storage strategy like rehearsal is likely to extend into the retrieval period and function as a retrieval strategy" (p. 197). To this author (Flavell, 1977), rehearsal is a complex activity requiring a high degree of coordination and integration and possibly consisting of a group of related

memory strategies. In general, therefore, what stands out in the psychological research on rehearsal is its importance as a mnemonic, or memory enhancing, tool..

Another vision of rehearsal is provided by Smith (1983), who associates rehearsal in the native language with talking to oneself, a habit about which people do not talk much although it seems to be universal, very useful, and an intrinsic part of their lives. According to Smith, by means of rehearsal people prepare for what they might want to say or, conversely, review conversations after they have taken place. The habit of talking to oneself is very frequent. In an informal study he conducted, Smith found "all respondents reported silently rehearsing and evaluating language that they might overtly produce in the future, usually in spoken but also in written form" (p. 91). Silent rehearsal was found useful not only for many practical purposes, as for example, in preparing for an examination, but also for more creative tasks, such as imagining conversations that might never take place. Smith not only equates rehearsal with talking to oneself but also links rehearsal to inner speech[1]--a topic which has received considerable attention from a first language (L1) perspective (Johnson, 1984; Korba, 1989; McGuigan, 1978; Sokolov, 1972; Vygotsky, 1962/1934). Smith poses some very interesting questions for research on rehearsal, for

example, "what is the linguistic nature of inner speech?" and "what exactly is the range of functions of talking to oneself . . . ?" (p. 93).

Talking to oneself has long been recognized as a valuable aid in learning a second or foreign language (Farmer, 1972; Glendening, 1965; Nida, 1957; Rivers, 1979). As early as 1957, Nida recommended that foreign language (FL) students "practice thinking in a foreign language by making up imaginary conversations, constructing speeches, or recalling what one has heard or read in the foreign language" (1957, p. 24). Farmer (1972) encouraged self-talk in the belief that it provides confidence to those students who are fearful of speaking in public. Rivers (1979) wrote in the diary she kept while learning her fifth non-native language: "It is very important to try out in new sentences what you have just learned, if not to others, at least in private talk to yourself" (p. 77).

In addition to the literature mentioned, mental rehearsal is also described in studies dealing with the so-called "din phenomenon" associated with second and foreign language (FL) acquisition (Bedford, 1985; Chapman & Krashen, 1986; Guerrero, 1987; Krashen, 1983). In 1983, Krashen reported the existence of a "din" in the head, "an involuntary rehearsal of second language words, sounds, and phrases" (p. 41), which he had observed in several language

learners, including himself. Later empirical studies confirmed this phenomenon to be widespread among L2 and FL learners (Bedford, 1985; Chapman & Krashen, 1986; Guerrero, 1987). In harmony with his theory, Krashen hypothesized that the "din" is a symptom that acquisition is taking place. Perhaps also in keeping with his usual dismissal of monitoring as a successful acquisition activity, Krashen did not contemplate the possibility of rehearsal occurring voluntarily, that is, as a result of the learner's own desire to control input or production, and therefore did not consider it a language learning strategy. In a study conducted by Guerrero (1987), nevertheless, it was observed that, in addition to experiencing the involuntary playback of language called "din," the students also engaged in voluntary rehearsal, a form of monitoring language. During this voluntary, purposeful rehearsal, the students were consciously retrieving information from memory in order to prepare for future production. This preparation included "organizing the material to be utilized, checking correctness, locating words in memory, refining meaning, etc." (p. 544).

Another aspect of rehearsal described in the literature is that associated with written production. "Rehearsal is a normal part of the writing process," says writer Donald Murray (1982), who views the problem from a first language

(L1) perspective. According to Murray, rehearsal "usually begins with an unwritten dialogue within the writer's mind" (p., 173). Then there may be some scribbling, some talking to others, some writing in the mind, until the first written drafts begin to appear. Murray notes that "some writers seem to work more in their head" (p. 173) than others. But definitely, Murray claims, "we must, in every way possible, explore the significant writing stage of rehearsal which has rarely been described in the literature of the writing process" (p. 174).

Interestingly, mental rehearsal is not restricted to language. Mental "visual" rehearsal, that is, the use of images in the mind or visualization, is not uncommon and has been recommended not only for psychological and medical therapeutic purposes, but also in sports, the performing arts, and teacher training (Bailey & Hortin, 1982, 1983). Bedford (1985) also makes reference to spontaneous playback of music or mathematical formulas as other forms of rehearsal possibly connected to spontaneous playback of the second language.

To summarize, what can be gleaned about mental rehearsal from the literature? In the first place, it is obvious that although mental rehearsal is not very clearly presented in the field of language learning strategies, it does have a well-recognized status in psychology as an

important mnemonic operation. In addition, in L1 learning mental rehearsal has been considered a manifestation of talking to oneself and inner speech, phenomena which are associated with language production, either oral or written. In the L2 and FL literature, mental rehearsal has also appeared disguised as the din phenomenon and implicitly discussed by those who believe in the value of talking to oneself in the other language. All in all, mental rehearsal emerges as an exceedingly common cognitive activity--cognitive in the sense of being a mental operation related to the act of knowing--generally aiding the learning, use, and retention of a first, second, or foreign language. Though in this article mental rehearsal will be viewed primarily as the silent, covert practice of the second language, the literature also contains evidence of other nonverbal forms of rehearsal.

Empirical Study on Mental Rehearsal

A study was conducted with the purpose of finding out the nature of the inner speech that occurs during mental rehearsal of the second language. This study, reported in detail in Guerrero (1991), yielded information not only on the linguistic characteristics and functions of L2 inner speech, which was the main goal of the research, but also on mental rehearsal.[2] The following portion of this article

summarizes those aspects of the study which threw light on mental rehearsal as a language learning strategy.

Method

The study was carried out in two phases, both involving learners' retrospective reports.[3] In Phase I, a questionnaire (see Appendix for a listing of items), based on a five-category rating scale ranging from never (1) to always (5), was administered to 426 participants. These were Spanish-speaking ESL students enrolled at Inter American University of Puerto Rico. A proportional stratified sampling technique was used to draw samples of students from three levels of ESL proficiency: low (n = 161), intermediate (n = 192), and high (n = 73).[4] The approach to the questionnaire data analysis was mainly quantitative, with the use of descriptive and inferential statistics such as frequencies, percentages, medians, and one-sample chi-square tests to analyze the response distributions on each item of the questionnaire. To observe differences among the proficiency levels, the chi-square test, Cramer's V test, and Kendall's tau c test were used. Significance levels were set at $p<.05$.

In Phase II, 9 "rehearsers" were identified (low level: n = 2; intermediate level: n = 4, high level: n = 3) and interviewed twice to obtain information on the nature of the inner speech they had experienced while rehearsing in

connection to two communicative activities which had been conducted in the classroom.[3] These 9 rehearsers were students who had demonstrated a tendency to rehearse, as evidenced by their high scores (average 4-5) in questions 1, 19, 21, 25, and 34 of the questionnaire. Qualitative content analysis was applied to the eighteen interview protocols yielded by the 9 rehearsers.

Discussion of Results

The study made it possible to clarify many of the ambiguities that surrounded the discussion of mental rehearsal in the literature as well as to discover some new aspects of mental rehearsal as a learning strategy.

What type of strategy is mental rehearsal? In the first place, it became evident that mental rehearsal, which was operationally defined as the covert practice of the second language, involved a variety of behaviors or substrategies depending on the purpose for which it was used, a finding which supports Oxford's (1990) notion that "some language learning strategies. . . are very broad, containing many possible activities" (p. 17). This may help explain why rehearsal has been classified among such varied categories as practice (Rubin, 1987), repetition (Chamot, 1987; O'Malley et al., 1985), advance preparation (Chamot, 1987), and production (Tarone, 1983). Specifically, the study confirmed the occurrence of covert repetition of words

(item 8 in the questionnaire, χ^2 [4, N = 426] = 257.920, p<.001) and preparation for future written and oral tasks (items 19 and 20; see Table 1 for statistical values on these items) among the participants. Repetition and advance preparation are narrow categories which may easily be subsumed under the broader ones, practice and production. In the second place, the psychological view of rehearsal as a mechanism for remembering, albeit valid, appeared to be too limited. While the mnemonic role emerged as a major purpose of rehearsal, other equally important roles were discovered.

Task-related and self-related rehearsal. The study revealed two major types of rehearsal: task-related and self-related. During the interviews and in the comments to the questionnaire, the students not only provided evidence of having rehearsed in relation to the assigned communicative activities or other tasks mentioned in the questionnaire but also described their experiences with rehearsal in the second language as a self-motivated activity. Comments like the following were typical: "When I'm alone at home or some other place, I make dialogues in my mind. I always imagine myself talking to someone, discussing various topics in English, or else I talk to myself. . . . My mind knows more than what I express through my mouth. . . . I think I know enough English

inwardly, but I don't express it because of shyness." To distinguish between both types of rehearsal, then, it is convenient to define task-related rehearsal as mental practice of the second language that is engaged in by the learner who is faced with the prospect of a future communicative activity or who has just experienced a similar activity and self-related rehearsal as self-talk not related to any specific task.

The roles of inner speech during mental rehearsal. Both in task-related and in self-related rehearsal, the participants reported using inner speech for various purposes. While the psychological literature had stressed primarily the mnemonic role of rehearsal, the study identified eight different roles of inner speech during mental rehearsal: ideational, mnemonic, textual, instructional, evaluative, affective, interpersonal, and intrapersonal. Most of these roles presented several specific functions, as shown below (the corresponding number of the questionnaire item used to measure such functions is given in parentheses where appropriate):

ROLES	SPECIFIC FUNCTIONS
1. Ideational	to create ideas
	to analyze ideas
	to clarify thoughts (30)
2. Mnemonic	to store language in memory (8)

	to retrieve language from memory (11)
3. Textual	to create/give structure to oral or written texts (19, 20, 21, 23)
	to organize verbal data in a sequence (22, 24)
	to experiment with language
4. Instructional	to imitate pronunciation (9)
	to apply grammar rules (28)
	to make sentences with words (10)
5. Evaluative	to assess extent and quality of language knowledge
	to self-evaluate and self-correct language (25, 26, 27)
	to other-evaluate and other-correct language (29)
6. Affective	to obtain self-satisfaction
	to reduce nervousness
	to acquire self-confidence
	to obtain self-diversion
	to improve self-image
7. Interpersonal	to imagine conversations with others (34)
8. Intrapersonal	to talk to oneself (35)

Table 1 indicates (1) the type of data which provided evidence for the above mentioned roles and (2) questionnaire item numbers, chi-square values, and medians, where appropriate.

Insert Table 1 about here

Of the roles tested through the questionnaire, the most frequent ones were the ideational (for the purpose of clarifying thought), the mnemonic (in its storage and retrieval functions), the textual (in the creation of oral and written texts and in the organization of verbal data), the instructional (as applied to the mental imitation of pronunciation), and the evaluative (in such functions as assessment of language knowledge, other-evaluation, and self-correction of pronunciation). In all these roles and functions, the median was category 4 (often) on the five-point questionnaire rating scale, with the outstanding exception of the use of mental rehearsal for the creation of oral texts, the median for which was category 5 (always). The following data obtained from item 19 on the questionnaire ("If you have to talk to someone in English or you have an oral presentation, do you mentally rehearse what you are going to say in your mind?") are revealing of the importance of silent rehearsal of oral texts: 92.95% of

the participants gave Yes answers (collapsed sometimes, often, always responses, as opposed to No answers: never, almost never) to this question, 52.35% choosing the always category.

Class-related and class-unrelated mental rehearsal. In the questionnaire, two items measured the extent to which mental rehearsal was related to the English class (item 31) or not (item 32). An analysis of the items revealed that the participants engaged both in class-related as well as in class-unrelated rehearsal: significantly more Yes than No responses were found both for item 31 (χ^2 [1, N = 426] = 28.404, $p<.001$) and for item 32 (χ^2 [1, N = 426] = 119.897, $p<.001$). Interestingly, a greater percentage of Yes responses was found for class-related mental rehearsal (76.53%) than for class-unrelated mental rehearsal (62.91%). This finding indicates that, for the participants, L2 rehearsal was not restricted to the class, but occurred more often in relation to it.

Spontaneous and deliberate rehearsal. As suggested by the literature, rehearsal appeared to occur both spontaneously (Bedford, 1985; Krashen, 1983) and deliberately (Guerrero, 1987). During the interviews, the students reported suddenly recalling language related to their assigned communicative tasks, much without their control, while they were engaged in other activities. In

this, mental rehearsal closely resembled Krashen's (1983) description of the din phenomenon. On some occasions, spontaneous verbal rehearsal was accompanied by recall of a visual image, particularly when the communicative task involved pictures. In addition to this spontaneous rehearsal, the students also reported deliberately making efforts to retrieve words from memory and to manipulate them in preparation for, or in evaluating, the communicative activities. The alternate use of deliberate and spontaneous rehearsal is clearly seen in the next student comment: "When I am interested in a word, I think and think about it for five, ten minutes, so that I won't forget it. Within about two hours, the word comes back, and I repeat it until I learn it."

The finding of these two types of rehearsal may help explain why it appears as both a cognitive and a metacognitive strategy in the literature. If the main difference between cognitive and metacognitive strategies lies in the amount of awareness and control exercised by the learner while carrying out the mental operation (Rubin, 1987; Oxford, 1990), spontaneous rehearsal then remains a purely cognitive strategy as long as it involves involuntary repetition or recall of language material. Deliberate rehearsal, on the other hand, becomes a metacognitive behavior as the learner exercises control over it and is

capable of utilizing it voluntarily for the accomplishment of certain tasks.

The existence of two types of rehearsal--spontaneous and deliberate--also throws light on at least one aspect of the conscious/unconscious confusion that some researchers are trying to unravel (McLaughlin, 1990; Schmidt, 1990). In line with Krashen's famous distinction, Guerrero (1987) had speculated that spontaneous rehearsal (the din in the head) might have a subconscious origin', while voluntary rehearsal had all the characteristics of the conscious Monitor. Since it is time for more precise terms, as Schmidt (1990) and McLaughlin (1990) convincingly argue for, the spontaneous/deliberate dichotomy is proposed as a more accurate nomenclature than the unconscious/conscious contrast for the type of mental behavior described above. Furthermore, the discovery of deliberate rehearsal adds evidence to the notion that many researchers (Long, 1990; McLaughlin, 1990; Schmidt, 1990) are now trying to emphasize, namely, that a great deal of purposeful control, attention, and awareness are involved in successful L2 or FL learning.

The purposes of self-related rehearsal. As mentioned before, the participants of the study engaged not only in task-related rehearsal but also in self-related rehearsal. In self-related rehearsal the learners used inner speech for

several self-related purposes: self-fulfillment, self-evaluation, self-instruction, self-diversion, and self-development. In self-related rehearsal for self-fulfillment, the learners rehearsed to feel good or please their ego. One student, for example, said she rehearses because she loves English and enjoys practicing it. Another student used these words to explain why he does mental rehearsal: "I think every person has an ego. My ego tells me that I want to learn English no matter what." A self-evaluation purpose was apparent as the learners rehearsed to test their knowledge of the second language. A participant, for example, observed that sometimes, when she is thinking in Spanish, she tries to see whether she can think the same in English. Another student reported her habit of saying to herself in English, as she is going by car, the names of everything she sees to check whether she knows those words in English. Self-instruction was the purpose involved as some learners mentally practiced to learn new aspects of the second language. A participant, for example, said: "They tell me a new word in English and I repeat it in my mind." Rehearsal for self-diversion occurred as the learners mentally experimented or played with the second language to entertain themselves or, as one put it, because "it's fun." One student, who worked as salesman in a department store, reported frequently talking to himself in English as he

waited for customers. Finally, self-related rehearsal served a self-development purpose when the learners used their inner speech in English to clarify feelings and ideas, solve personal conflicts, or have internal debates with themselves or others. A student, for example, commented she was very upset one day and started arguing in English in her mind. Another student reported an occasion when she started mentally explaining to her boyfriend in English why she wanted to study biology and not something else.

When did mental rehearsal occur? Another finding of the study concerned the moments when mental rehearsal was most likely to occur. Self-related rehearsal, as well as spontaneous task-related rehearsal, was described in the interviews as taking take place most often when the participants were alone, in a relaxed or contemplative mood, or engaged in mechanical chores. Here are some examples of such moments mentioned by the participants: when the person was very calm, resting, or about to fall asleep; when watching TV in English; when waiting for someone; when travelling in a car; when washing dishes; when ironing; when taking a bath. One student claimed, however, that she usually mentally rehearses in English either when she is very calm or when she is very excited. In addition, task-related rehearsal, that is, rehearsal associated with the communicative activities of the study, reportedly occurred

at any time between the moment the students were told of the upcoming task and the time they met with the researcher for the interview once the task was over. In other words, rehearsal was found to happen before, during, or after the task. As Bailey & Hortin (1982) stated for visual rehearsal, it is likely that mental rehearsal can happen anywhere and anytime, with "some form of solitude" (p. 5) as the necessary condition for it to occur. Certainly, some form of introspection must be associated with rehearsal. Notice the following student comment about her rehearsal before one of the communicative activities: "All of us who were waiting [to be called for the oral task] became silent, so I got into myself and started thinking of what I would say."

Differences in mental rehearsal according to proficiency. Some differences were observed in the use of mental rehearsal when the students' ESL proficiency level (low, intermediate, and high) was taken into account. Significant differences in use of the native language (item 2), correction of grammar errors (item 27), answering questions in the mind (item 33), and class-unrelated rehearsal (item 31) were shown by the chi-square test when applied to responses on the five-category distribution. When responses were redistributed as No and Yes, additional

differences were found in imagining conversations with others (item 34) and talking to oneself (item 35). All these aspects of rehearsal showed a positive correlation with proficiency level, except for the use of the native language, which correlated negatively with proficiency, and correction of grammar errors, which was highest for the intermediate students. (See Tables 2 and 3 for statistical data.)

Insert Table 2 about here

Insert Table 3 about here

In general, these results show that as L2 proficiency increased, so did the participants' tendency to answer questions in the mind, to rehearse more language material not related to the class, and to engage in mental conversations with others and with themselves, while their use of the native language within the second language tended to decrease. Mental correction of grammar errors only increased for the intermediate students, perhaps because they were at a stage when they felt more concerned with language form than the low or the high proficiency students.

Why is L2 mental rehearsal important? In the comments to the questionnaire and during the interviews, the participants of the study repeatedly expressed their belief in the importance of mental rehearsal for the learning of the second language. According to the students, mental rehearsal is important because (1) it helps retention: mental rehearsal prior to an activity usually facilitates recall; (2) it is useful: through mental rehearsal the students practice language that they might have to use later in a real life situation; (3) it contributes to learning: the students learn new words, practice pronunciations, find errors, try out sentences, while mentally rehearsing; and (4) it provides self-confidence and reduces the fear of speaking. One student comment exemplifies some uses of mental rehearsal: "I use my inner speech to practice or to imagine dialogues with other people. I do a lot of imitation of what I hear on Cable TV and sometimes I learn dialogues that I think are going to help me."

Making students aware of L2 mental rehearsal. A major implication of this study is that L2/FL students could profit from becoming more aware of mental rehearsal as a strategy for learning the other language and of its possible benefits. Even though the majority of the participants engaged in mental rehearsal to some extent, many of them said they did not know what it was or what it was for. Some

of their comments were: "I realize now that I used to think in English without being aware of it" and "This questionnaire clarified something for me. I thought I was crazy whenever I talked to another person in my mind." Another student commented about the questionnaire on mental rehearsal: "[it] helps to raise consciousness among people about how they can help themselves in practicing English; it has useful ideas." Explicit classroom discussions about such a powerful and inherently human resource of the mind could certainly enlarge the students' metacognitive and metalinguistic knowledge (Chamot, 1987; Masny, 1987; Pelose, 1989).

A word of caution and a justification of self-report data. Self-report data should always be handled with caution. Thus, it is expected that the empirical evidence presented here be taken for what it is: learners' retrospective self-reports about a very private, totally unseen, L2 behavior. Nevertheless, given the fact that mental rehearsal is literally inaccessible to outside direct observation, self-reports based on the learners' own perceptions of the phenomenon seem a valid and necessary starting point for its investigation. This is not to say that more traditional research methods are not possible to investigate rehearsal. Experimental approaches, such as, for example, the one used in Crookes's (1989) study of

planning (another highly covert L2 behavior), can be employed. Yet, they are always bound to be more or less indirect assessments of the phenomenon. Only a combination of traditional and nontraditional methodologies (see, for example, Flower & Hayes's [1981] use of the think-aloud technique to explore the writing process) will yield an approximation of the true nature of L2 mental rehearsal.

Conclusion

In conclusion, an in-depth study of mental rehearsal has contributed to a better understanding of its nature as well as confirmed its importance as a second language learning strategy. Though mental rehearsal can be defined in a few words as the covert practice of the second language, a review of pertinent literature and an analysis of data obtained through an empirical study lead to a closer view of mental rehearsal as an activity during which inner speech may adopt several roles: ideational, mnemonic, textual, instructional, evaluative, affective, interpersonal, and intrapersonal. The study showed mental rehearsal can occur not only in connection to assigned language tasks but also to self-related purposes: personal fulfillment and development, language instruction and evaluation, and diversion. Though mental rehearsal may happen spontaneously in a person's mind, especially in solitary circumstances, it may also be triggered at will.

Furthermore, some aspects of mental rehearsal seem to vary with L2 proficiency.

Raising awareness about the nature of mental rehearsal and the possibilities of manipulating it for the advantage of learning a second language is recommended if more autonomous, self-controlled language learners are desired. Likewise, the continuation of research on mental rehearsal is suggested. Fruitful areas of investigation might be the question of whether and how mental rehearsal affects performance, the role of rehearsal in the writing process, and the kind of classroom activity which stimulates more mental rehearsal. A mixture of traditional and nontraditional methodologies is offered, however, as the best route for a complete understanding of the mental rehearsal strategy.

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APPENDIX

Questionnaire on Inner Speech and Mental Rehearsal of the Second Language

The following is only a listing of the questionnaire items. For a complete version of the questionnaire, see Guerrero (1991) or contact the author.

1. Have you had inner speech in English?
2. Is your inner speech in English mingled with Spanish?

Is your inner speech in English made up of

3. words?
4. phrases?
5. sentences?
6. conversations or dialogues?
7. Can you "hear" the sounds of English in your mind?

When you mentally rehearse,

8. do you repeat words you want to learn?
9. do you try to imitate the pronunciation of words you have learned?
10. do you try to make sentences with certain words?
11. do you try to recall words you have learned?
12. do words with meanings you do not know well come to your mind?
13. do your thoughts in English make sense?

14. Do you hear in your mind voices of other people in English?
15. Do you repeat aloud any of the words of that inner speech when you are alone?
16. Do you look up in a book or dictionary the meaning of English words that come to your mind?

When you mentally rehearse in English,

17. does your inner speech consist of short thoughts?
18. is your inner speech expressed in long, elaborate thoughts?
19. If you have to talk to someone in English or you have an oral presentation, do you mentally rehearse what you are going to say?
20. If you have to write something in English, do you rehearse first in your mind what you are going to write?
21. Do you mentally rehearse how you are going to say something in English before speaking?
22. Do you plan in your mind the sequence in which you are going to present your ideas orally?
23. Do you mentally rehearse how you are going to write something in English before writing it?
24. Do you plan in your mind the sequence in which you are going to write your ideas?

25. Do you ever think how you would write or say something in English, even if you are not going to use it?
26. Do you try to correct the pronunciation of words in your mind?
27. Do you try to correct grammar errors when you mentally rehearse?
28. Do you try to apply the grammar rules you have learned to your inner speech in English?
29. When you hear other people speaking English, do you mentally evaluate how those people use the language?
30. Do you try to put your thoughts in English in order so that they are clear in their message?
31. Do you catch yourself thinking in English about things not related to your English class?
32. Is your inner speech in English related to your English class?
33. When the English teacher asks a question in class, do you answer it in your mind even though you are not called to answer?
34. Do you imagine dialogues or conversations with other people in English?
35. Do you talk to yourself in English?

Footnotes

[1]Colle (1982) also identifies rehearsal with inner speech.

[2]Although some researchers (Colle, 1982; Smith, 1983) seem to equate mental rehearsal with inner speech, this researcher's point of view is that they should be distinguished: While mental rehearsal is a cognitive operation, inner speech is the language medium in which the operation is carried out.

[3]Due to space reasons, only a brief summary of the methodology of the study is reported here. For details, consult Guerrero (1991).

[4]The students' College Board's ESLAT (English as a Second Language Achievement Test) scores were used for proficiency classification purposes: low level, <400; intermediate level, 400-499; and high level, 500-599.

[5]Communicative Activity 1 consisted of a simulated job interview in which pairs of students adopted the roles of interviewer and applicant. Communicative Activity 2 involved having to discover differences in a picture, two versions of which were handed to each member of a pair. The students had a week to prepare for these communicative activities.

[6]Some of these roles are also recognized functions of overt speech. For example, the ideational, the

interpersonal, and the textual are considered the "macrofunctions" of language by Halliday (1973).

[7]There is evidence that spontaneous verbal recall requires retrieval from long-term storage (Buschke, 1974) and that information in long-term memory takes place out of consciousness (Bogoch, 1968).

[8]Eighty-four percent of the 426 participants (low level: 75%, intermediate level: 89%, high level: 90%) answered affirmatively question 1 (Have you had inner speech in English?), a fact which suggests that mental rehearsal was a reality for a majority of them.

Table 1

Type of Data, Questionnaire Item Number, and Statistical Values of the Roles of Inner Speech During Mental Rehearsal of the Second Language

Role	Type of data	Item number	χ^2	Mdn.
IDEATIONAL	questionnaire	30	267.192	4
	interviews			
MNEMONIC	questionnaire	8	257.920	4
		11	143.258	4
	interviews			
TEXTUAL	questionnaire	19	335.220	5
		20	312.145	4
		21	326.911	4
		22	212.756	4
		23	186.559	4
		24	188.390	4
	interviews			
INSTRUCTIONAL	questionnaire	9	288.624	4
		10	157.897	3
		28	133.437	3
	interviews			

(table continues)

Role	Type of data	Item number	χ^2	Mdn.
EVALUATIVE	questionnaire	25	202.920	3
		26	227.638	4
		27	154.446	3
		29	171.019	4
		33	252.521	4
	interviews			
AFFECTIVE	interviews			
INTERPERSONAL	questionnaire	34	116.840	3
	interviews			
INTRAPERSONAL	questionnaire	35	97.357	3
	interviews			

Note. All χ^2 values were significant at $p<.001$, df = 4, N = 426, except for item 11 where df = 3 because there were no never responses. Mdn. = Median.

Table 2

Differences in Aspects of Mental Rehearsal Among Low, Intermediate, and High ESL Students Based on the Five-category Response Distribution

Aspect of rehearsal	chi-square*		Cramer's V		Tau c
	χ^2	p	V	p**	
use of the native language	16.224	.05	.138	.05	-.047
correction of grammar errors	15.991	.05	.137	.05	.054
answering questions in the mind	20.548	.01	.155	.01	.148
class-unrelated rehearsal	31.051	.001	.191	.001	.184

*df = 8, N = 426. ** approximate

Table 3

Differences in Aspects of Mental Rehearsal Among Low, Intermediate, and High ESL Students Based on the No/Yes Response Distribution

Aspect of rehearsal	% of Yes responses			chi-square*	
	Low	Intermediate	High	χ^2	p
correction of grammar errors	77.0	87.5	76.7	7.891	.05
imagining conversations with others	62.1	74.0	74.0	6.633	.05
talking to oneself	52.8	66.7	69.9	9.478	.01

*df = 2, N = 426